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ABSTRACT

Presented is an analysis of cost benefit factors in special education showing that special education for persons with handicaps of varying severity leads to decreased dependency, increased economic self sufficiency, and longterm cost effectiveness. Considered are the following aspects: education as human capital investment, the economic benefits of special education, basic aspects of self sufficiency, the near average earnings of the mildly disabled, the greatly reduced earnings of the severely disabled, education for self sufficiency, costs of special education, costs of institutionalization, long term quantitative benefits of special education, the earnings-education ratio, special education payback via tax recoupment, payback period analysis results, positive investment return of special education, a case for public investment in special education in foreign countries. Tables include a continuum of alternative living arrangements, a continuum of education alternatives, components of special education costs, a comparison of cost indices by exceptionality and six different studies (and states), the ratio of future earnings of retarded workers to costs of their public education, and special education payback period computations. (DB)

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DOLLARS AND SENSE IN SPECIAL EDUCATION

by David Braddock, Ph.D.

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DOLLARS AND SENSE IN SPECIAL EDUCATION

> The difference between the most dissimilar characters, between a philosopher and a common street porter seems to arise not so much from nature, as from habit, custom and education.
>
> Adam Smith, 1776

Two centuries ago, Scottish philosopher Adam Smith published The Wealth of Nations, a treatise that later revolutionized Western economic thought and caused recognition of Smith as forerunner of the classical school of economics. Smith couldn't possibly have imagined the intense degree to which education would be called upon to both accelerate the rate of growth of economically developing nations and also to equalize the distribution of national income. Today education occupies an important position in every major economy in the world. In the United States over six percent of the annual trillion dollar Gross National Product is spent on formal schooling alone. This spending rate is increasing at a rate double that of the entire economy (Bowles, 1970).

EDUCATION AS HUMAN CAPITAL INVESTMENT

There has been a remarkable growth over the past 15 years in economic research focusing upon education as an income generating form of human capital. To illustrate this point, Hansen (1970) examined a bibliography on the subject developed by Blaugh (1968). Of the 1100 entries, only 45 had appeared in the literature prior to 1961. Hansen concluded that two underlying themes run through much of the work: 1) there are important links between education, productivity, and (therefore) income; and 2) the role of education can be

explored fruitfully when viewed as an income generating form of human capital. The seminal work of Schultz (1961) and also Becker (1964, 1975) have provided the most stimulating encouragement behind human capital research.

According to Becker (1975) the motivating factor behind most human capital research has been a realization that growth in physical capital explains a relatively small part of the income growth in most countries. The following quote is a revealing excerpt from Becker's 1964 edition of the book, Human Capital, which first set forth a theoretical and empirical analysis of human capital investment with special reference to education.

> Probably the most impressive piece of evidence is that more highly educated and skilled persons almost always tend to earn more than others. This is true of developed countries as different as the United States and the Soviet Union, of underdeveloped countries as different as India and Cuba and of the United States a hundred years ago as well as today. Moreover, few if any countries have achieved a sustained period of economic development without having invested substantial amounts in their labor force and most studies that have attempted quantitative assessments of contributions to growth have assigned an important role to investment in human capital. Again inequality in the distribution of earnings and income is generally positively related to inequality in education and other training. To take a final example, unemployment tends to be strongly related, usually inversely, to education. (p. 10)

Can the education of handicapped children and youth be explored fruitfully as an income generating form of human capital? Do the costs allotted for educational and training programs for handicapped individuals produce a positive or a negative return on this investment? Such programs are presumably designed to augment personal self sufficiency. Hence, do disabled students, educated toward self sufficiency at public expense, "pay back" the government's monetary investment in them through taxes on earned income and through other benefits to which dollar values can be assigned?

Unfortunately, answers to these questions are relatively nonexistent, as recently noted by public policy researchers at the Rand Corporation (Kakalik, Brewer, Dougharty, Fleischauer, Genensky, 1973). Rand researchers noted that a rich and growing literature on the subject exists in general education. They attributed the relative neglect in special education cost analyses to the inherent difficulty and high cost of such studies coupled with a lack of available data. Specifically: no evaluatively useful measures of output are regularly collected on special education programs. Thus, an answer to the question of what is to be gained in an economic sense from investing public dollars in the education of handicapped children and youth is simply not known.

What Are The Economic Benefits of Special Education?

What, indeed, is to be economically gained from public investment in special education? The purpose of the present review and analysis is to undertake a preliminary answer to this question. In the course of our inquiry we shall first consider some basic aspects of self sufficiency; especially its correlates with earnings and severity of disability. Then, we briefly review recent data on the costs, respectively, for public school special education programs and also for institutionalization in mental health or mental retardation facilities. The analytical portion of the paper is presented next. It illuminates some of the long term quantitative benefits of special education -- most notably: tax recoupment from earnings, income maintenance reductions, and institutional avoidance savings. Hence, three major subject sections -- self sufficiency, costs, quantitative benefits -- and a concluding comment on prospects for international special education investment -- provide the organizational focus for the remainder of the paper.

SELF SUFFICIENCY: BASIC ASPECTS

In the broad social context, disability equates with role dysfunction in education, work, or independent living. Specifically, disability consists of a significant disparity (however defined) between the role functioning of an individual and the average expectable role functioning of cohorts (Moriarty, undated). If the functional disparity is extreme, the disability is said to be severe. We are, however, probably more semantically accustomed to use of the term "handicapped" to refer to a functional disparity in the educational setting and "disability" to refer to a disparity in the contexts of work and independent living. Obviously, many children are labeled handicapped in the educational setting, but they are not at all disabled in work and independent living during adulthood. Many follow-up studies, cited below, and also numerous prevalence studies (Conley, 1973), have supported this conclusion and it is a very important point to consider in so far as the relationship between handicap or disability and economic self sufficiency is concerned.

A Relative Concept

Self sufficiency is a relative concept. It begs the question: sufficient to do what? In what context? As shown below in Figures 1, 2, and 3, three service areas were chosen to illustrate the continuum of self sufficiency in three functional contexts: living arrangements, education, and employment (New Jersey Plan in Braddock, 1976). The normative or typical living arrangement in the United States is depicted as the individual's private home. The normative educational arrangement is termed conventional education in the regular classroom. And, the typical employment mode is labeled as competitive employment.

Figure 1

CONTINUUM OF ALTERNATIVE LIVING ARRANGEMENTS

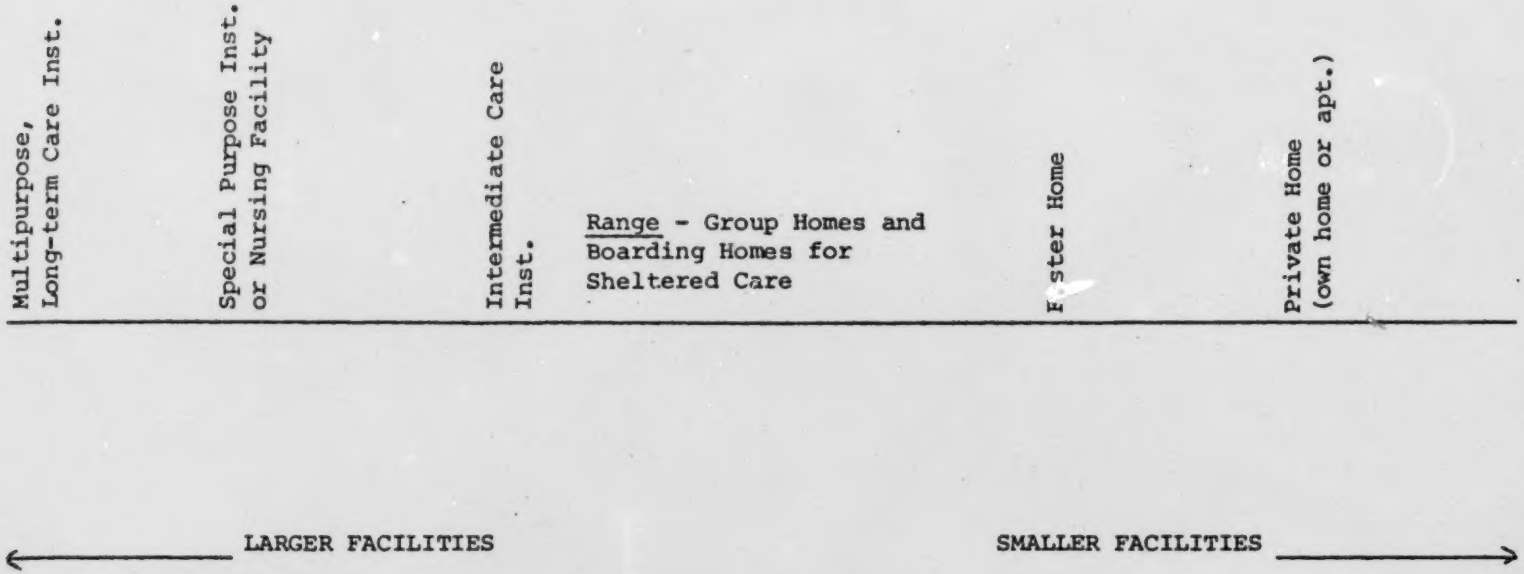

Multipurpose, Long-term Care Inst.
Special Purpose Inst. or Nursing Facility
Intermediate Care Inst.
Range - Group Homes and Boarding Homes for Sheltered Care
Foster Home
Private Home (own home or apt.)
LARGER FACILITIES
SMALLER FACILITIES

Figure 2

CONTINUUM OF EDUCATION ALTERNATIVES

Home Instruction	Residential Special Schools	Special Schools for "Day Students"	"Split" Special and Conventional Schools	Special Classes Within Regular School	Resource Room	Supplemental Instruction in Standard Classrooms	Conventional Education

Abnormal — Normal

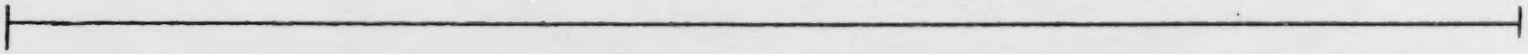


Figure 3

CONTINUUM OF EMPLOYMENT ALTERNATIVES

No Gainful Activity	Work Activity Center	Homebound Work	Sheltered Workshop	Sheltered Work* in Regular Setting	Selected Placement**	Regular Competitive Employment (No Limitations)

Abnormal — Normal

*Sheltered work may mean work performed for less than the prevailing hourly rate, or performed under special protective circumstances (such as different physical facilities), or at less than 50% productivity.

**A regular job chosen from among a limited range of jobs suitable for the disabled person, including traineeship and apprenticeships.

In marked contrast to normative role functioning in these contexts -- at the abnormal ends of the service continuum in the illustrations -- are congregate long-term institutions, homebound education and no employment activity at all. Between these extremes of relative self sufficiency on the one hand and relative dependency on the other lie many intermediate options. The vast majority of the handicapped, perhaps 95% of retarded individuals, for example, are able to function satisfactorily at or very near the normal extremes of the continuums (President's Committee on Mental Retardation /PCMR/, 1976). A special exception applies to certain severely disabled individuals who, by reason of their serious physical or psychological limitations, can attain only partial or no independence at all through school, at work, or at home.

Mild Disability: Near Average Earnings

The results of 22 follow-up studies of vocational success of the retarded were analyzed by Conley (1971). He concluded that a surprisingly large percentage of adult retarded individuals are vocationally successful. Intellectual deficiency, except in the case of relatively severe retardation, was not found to be a major cause of vocational failure. Conley's findings were supported by Cobb's (1972) review and more recently by Jones and Jones' (1976) review. The latter remarked that between 75 and 90% of the handicapped subjects followed up in all self sufficiency studies have "been found to be totally self supporting" (p. 6). Eighty-seven percent of mildly retarded adults are employed and their earnings are believed to be between 85 and 90% of the average for the entire U.S. population (Conley, 1971), (Kennedy, 1962).

An interesting follow-up study was conducted on a random sample of the aurally, visually and physically handicapped graduates of the Cincinnati, Ohio

public schools (Prisuta, 1970). Even though the study findings suggested that some school experiences proved to be unrealistic for these children, the majority of them had nonetheless successfully adjusted occupationally to unskilled and semiskilled jobs as adults. We can only surmise that if the school program links specific skills training with specific job opportunities in the area labor market, a very high success rate is not unrealistic at all for these groups. And, as discriminatory employment barriers are removed in accord with the forthcoming implementation of new requirements for employer affirmative action planning for the handicapped, unemployment and underemployment will diminish.

We also suspect, but do not have data to prove, that the earnings of non-cognitively handicapped individuals with aural, visual or other physical handicaps is near parity with, and more occasionally than not, slightly above the near-average earnings of the employed mentally handicapped. Rehabilitation studies, for instance, indicate that individuals with orthopedic handicaps and blindness earn higher wages under sheltered work circumstances (Greenleigh, 1975) and they also pay back their rehabilitation costs in a relatively shorter period of time through regular employment than do mentally handicapped individuals (Berkeley Planning Associates, 1973).

Severe Disability: Greatly Reduced Earnings

One of the few studies on earnings of the severely intellectually deficient (Saenger, 1957) demonstrated adult earnings to be only about one-fifth of the average earnings for adult males. This is in approximate conformity with the more recent Greenleigh (1975) sheltered workshop remuneration study which reported an average wage rate of $.99 per hour for both emotionally and also intellectually handicapped workshop employees. Severe disability correlates positively with a drastic curtailment of personal earnings. Nearly 60% of the men certified as severely disabled under the U.S. Social Security program had no earnings at all

during a 1966 study reported by Swisher (1971). Of those with earnings the median was only $700 a year. Individuals certified by the Social Security Administration as less seriously disabled, e.g., "occupationally limited," had earnings six times as great -- $4788 per year. Median earnings for all disabled women was $2371, which amounted to about 90% of the median income for all persons with earnings in the U.S. population (Swisher, 1971, p. 17). Swisher concluded that "the severely disabled were largely out of the labor market and were dependent on transfer payments or earnings of other unit or family members for income" (p.28). Swisher attributes the low earnings of the severely disabled in part to the large proportion of older, poorly educated and minority race members in the group. These additional handicaps for many disabled persons were "an integral part of the disability" (p. 28). A more recent Social Security Administration study by Frolich (1976) found that a direct relationship exists between severity of disability, reduced earnings, and therefore, personal self sufficiency. An inverse relationship was also found to exist between severity of disability and recipiency of public income maintenance payments. In fact, about 60% of the severely disabled were in a family unit receiving income maintenance. Only one-fourth of that proportion among those persons with more mild work limitations received income maintenance payments.

Education for Self Sufficiency

The emerging consensus among educators and clinicians is that all handicapped persons, "with the possible exception of those who lack all capacity to respond to stimulation," are capable of learning and should be educated in ways which increase self sufficiency and reduce dependency (PCMR, 1976, p. 131). Dittrick's (1975) study of work activity and the developmentally disabled partly illustrates the "why" behind the proficient outlook for even severely handicapped persons. His data show that when the intelligence quotient drops below 20, 10% of the retarded persons in an institutional and community sample he studied could still do simple work;

a much higher rating of .46 work participation was obtained in the 20-35 IQ range. And, an 82% work participation rate was obtained for individuals mildly deficient intellectually (IQ 52-67). Since the distribution of intelligence conforms in theory to the shape of the normal curve, the IQ's of 99.7% of a given population will predictably fall between ± 3 standard deviations of the mean (Jensen, 1969). That is to say only .3% of the general population can be expected to not have an IQ between 55 and 145. But, the actual prevalence of severe intellectual impairment, for as yet unexplained reasons, is slightly higher than the normal curve theoretically suggests. Conley (1973, p. 33), for example, estimated the prevalence of severe retardation (IQ below 50) in the 5-19 age group to be about .4%. Linear extrapolation based on earlier work by Dingman and Tarjan (1960) indicates that about 516,000 persons in the United States today, using current population estimates (Census Bureau, 1976), fall into the severe category but less than one fifth of these persons -- 102,728 to be precise -- can be expected to have IQ's below 20. Hence, relatively few intellectually handicapped individuals show little promise of any gainful employment at all. And most of these individuals can be taught some simple self care skills.

In sum, earnings follow-up study findings, conducted primarily on intellectually retarded subjects, suggest that the vast majority of handicapped individuals, given proper education and training, appear able to attain complete economic self sufficiency. A small proportion -- perhaps 5 to 15% of the entire handicapped population -- do have considerably restricted horizons from an earnings standpoint. But many of these severely disabled individuals achieve partial self sufficiency. A minuscule proportion of the age 5-19 school age population -- speculatively, less than one-tenth percent -- will exhibit inert or near-inert, nonreactive behavior.

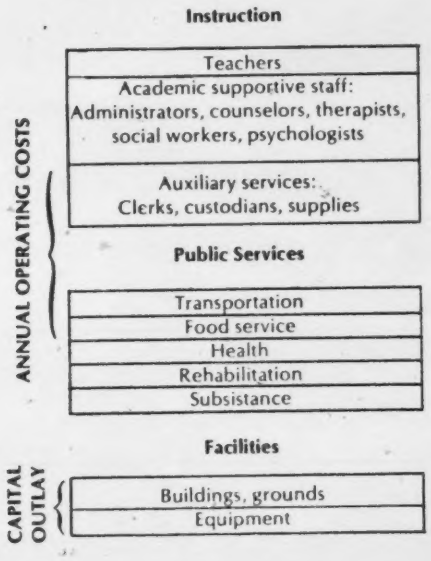
COSTS OF SPECIAL EDUCATION AND INSTITUTIONALIZATION

Special Education Costs

Costs for special education programs vary a great deal from one handicap to another and they also tend to rise or drop in direct accord with the severity of the handicap. Programs for speech handicapped children, for example, are much less expensive than are programs for the physically handicapped; programs for the mildly retarded are, likewise, less expensive than are programs for severely retarded children.

The operating and capital outlay costs for special education programs, as shown in Figure 4, fall into three cost categories: Instruction, Public Services, and Facilities.

Figure 4
Components of Special Education Costs



SOURCE: McClure, (1975, p. 42)

A number of recent studies have developed cost indices by disability category. A cost index is simply a number expressed as a multiple of general educational costs -- that is, as a multiple of amounts spent for education of the typical student. The results of some of these cost studies, all completed between 1970 and 1975, are summarized in Table 1 (Marinelli, 1976, p. 169).

Table 1

A Comparison of Cost Indices

	Study and States Involved					
Category of Exceptionality	*Rossmiller et al.[a] (Wis., Fla., Calif., Texas, and N.Y.)*	*Jones and Wilkerson[b] (Indiana)*	*Sorenson[c] (Illinois)*	*Snell[d] (Indiana)*	*Clemmons[e] (Minnesota)*	*Texas Education Agency[f] (Texas)*
Gifted	1.14					
Educable mentally retarded	1.87	1.63	1.72	1.94	1.71	2.83
Trainable mentally retarded	2.10	1.79	2.31	1.81	2.03	2.22
Auditorily handicapped	2.99	3.71	(hard of 2.35 hearing) 2.41 (deaf)	1.55	2.99	3.48
Visually handicapped	2.97	6.01	2.75		2.34	4.38
Speech handicapped	1.18	1.19		1.22	1.27	5.97
Physically handicapped	3.64	2.76	2.94	4.18	2.89	2.39
Special learning disorders	2.16	2.38	2.02	1.32	1.75	2.76
Emotionally disturbed	2.83	3.73	3.95			2.61
Multiply handicapped	2.73	2.93	3.38			
Homebound/Hospitalized	1.42	1.74		1.56	1.22	
Pregnant students						1.29
Minimally brain injured						2.94

Rossmiller, Hale, & Froehreich (1970) reported on the aggregate cost experiences of 24 school districts in five states. Because the sample studied was much larger than other studies of special education cost indices, the results probably present a more accurate picture of national trends in this area. In the study, the costs of special education programs by exceptionality was found to range from 1.18 times the cost of educating a so-called normal child ($1207 annually in 1974) to 3.64 for educating a physically handicapped child.

The cost index for the entire special education program averaged about twice that spent for regular education. Higher costs for special education were apparent in instructional costs, public service expense, and also in dollars expended for capital equipment investment. Reasons behind the higher costs were cited as lower teacher-pupil ratios, additional specialized personnel costs, extra transportation expense and increased capital outlay.

Costs of Institutionalization

The costs of special education are minor when compared to the costs of institutionalization. If a disabled individual is institutionalized, the economic consequence of the disability is immediately amplified. The most recent per-person maintenance expenditures reported for retardation institutions nationally is $26.02 each day (Scheerenberger, 1975); for mental health institutions, the per-diem rate is even higher -- $30.86 (National Institute of Mental Health, 1975). Institutionalization costs at these levels average about $10,000 per year. Yet remarkably, 25% of all 1973 admissions to retardation institutions were mildly or moderately retarded school age children -- children who should not have been in an institution in the first place (Braddock, 1976).

According to the National Association for Retarded Citizens (1973), substantial economic gains accrue to society when mildly, moderately, or even severely retarded individuals receive needed public services in community settings rather than in institutions. Reported savings to the community over a lifetime amount to between $64,768 and $701,462. Estimated savings vary inversely with the severity of retardation. Positive contributions to the community such as taxes on earnings and income

maintenance payment reductions were not considered in the Association's calculations. But realistically, the calculations overstate the savings to the community because the computations probably underestimate the costs of providing often nonexistent, but nonetheless necessary, comprehensive care services in the community on a par with the desired scope of services available in an institutional setting.

Jones and Jones (1976) have also recently reported on a cost study of long-term care services and they concluded that a substantial savings from deinstitutionalization ($5,000 per year) occurs only if the individual is able to live at home. In most cases this is not possible and community-based service delivery overall is associated with a quite small cost savings. One longitudinal follow-up study (Murphy & Datel, 1976), however, showed a substantial net savings to the community after depopulation from both mental health and retardation institutions. Results showed an average 10 year net savings -- mostly to state government -- of $20,800 per person. The only stratum in which costs exceeded benefits was that which contained ten unemployable clients in intensive care facilities (.99 ratio). Institutional avoidance costs constituted the major savings in all strata and other strata ratios varied from 1.52 to 11.86. The mean ratio was 1.98, but the sample size of 52 was small and the community tenure upon which 10 year cost-benefit projects were made was a mere 8.5 months.

In sum, the definitive verdict on the comparative costs of institutional versus community-based service delivery systems is elusive. It appears, therefore, unwise at the present time to insist that it will be a great deal cheaper to supplant institutions with community-based services. This is not to say that there are not other, more compelling ethical and legal reasons for doing so. One fact is evident: institutionalization is enormously expensive.

SOME LONG TERM QUANTITATIVE BENEFITS OF SPECIAL EDUCATION

An avowed goal of many countries, including the United States, is to attempt to achieve equality of educational opportunity through public school subsidies, scholarships, loans to individuals, and through special education for handicapped students. Does this make good economic sense? Becker (1975) certainly thinks so. He theorizes that greater equality of opportunity not only tends to reduce inequality in earnings in society, but it also increases the efficiency of the allocation. (Technically this is true, he says, because dispersion in individual human capital investrent supply curves is reduced). On a more practical level, expanded purchases by educated individuals, handicapped or otherwise, adds to corporate profits tax recoupment by government. Federal income tax -- the main tax recoupment source -- consists of only about one-half of all tax revenues paid to all units of government. There are also state income taxes, sales taxes, property taxes,and many other levies paid directly or indirectly by individuals to support government service (Tax Foundation, 1975). Conley (1973) recently concluded that about one-half of the productivity of the disabled accrues to the benefit of the general public. This is so because about 25% of their income is used to pay taxes and, if they were unemployed, income maintenance payments financed also out of general tax revenues would equal another 25% of total income.

The Earnings-Education Ratio

In Table 2 below, the ratio of future earnings of retarded workers to the costs of their public education are presented (Conley, 1973).

Table 2

Ratio of Future Earnings of Retarded Workers to Costs of Their Public Education, Discounted at 7%, 1970

	Adjusted for Percentage Employed		Assuming Continuous Employment	
	Earnings Only	Earnings Plus Unpaid Work Other Than Homemaking	Earnings Only	Earnings Plus Unpaid Work Other Than Homemaking
Mildly retarded				
Males				
All regular education	8.3	10.4	9.7	12.1
All special education	4.3	5.4	5.1	6.4
Combination	5.9	7.4	6.9	8.6
Females				
All regular education	1.8	2.5	5.7	7.8
All special education	1.0	1.3	3.0	4.1
Combination	1.3	1.8	4.0	5.6
Moderately retarded				
Males	0.3	0.4	0.8	1.0
Females	0.1	0.1	0.4	0.6

These ratios are gross estimates of the relationship between the resources used in the education of retarded children and represent only a part of the resulting benefits. This analysis implicitly assumes that the provision of education is the only additional use of public resources that must be justified on the basis of program outcomes (e.g., beyond medical care, parental care, etc.)

Inspection of the data presented in Table 2 reveals at least three notable findings:

- The lifetime earnings of mildly retarded adults is many times the costs of their education -- almost 6:1, adjusted for the percentage employed. Educational services can therefore be justified on the basis of earnings alone.

- Whatever assumptions are used to represent the benefits and costs of educating the mildly retarded, the benefit-cost ratio exceeds the critical value of one. The range is between 1:1 and 12:1.
- The benefit-cost outlook is much less favorable for the moderately retarded. The range is between .1:1 and 1:1. Institutional avoidance savings, ignored in the Conley analysis, are incorporated into the detailed cost analysis to follow immediately.

Special Education Payback Via Tax Recoupment

The educational payback period is the amount of time necessary for an educational program to pay back its costs. It is the number of years benefits have to accumulate before educational costs spent on the special education program are matched with benefits. "Payback period analysis" involves developing a production function that relates inputs such as per pupil expenditures to outputs such as estimated taxes to be paid. In the present analysis, the assignment of dollar values to the input process has been based on the excess cost work of Rossmiller et. al. (1970). By using Rossmiller's cost index formulations and current educational expenditure data, we determined the yearly excess cost in 1974 and then the excess costs for a hypothetical 12 year educational experience for a child in each disability category. To gauge the output process, we computed from projected earnings, for continuous employment at the federal minimum wage level, the estimated taxes to be paid, the projected net reduction in income maintenance payments accrued, and finally, for retardation and emotional disability, the net institutional expenditures avoided. This ultimately yielded the "Long Term

Savings to the Community" from special education investment. These data are presented in Table 3 along with a technical note explaining the computational assumptions and methods used. Earnings for severe retardation and severe emotional disability were based on a $.99 hourly wage in conformity with the aforementioned Greenleigh (1975) study. A reduced tax rate of 15% as opposed to 25% for the non-severe categories was used. Totally dependent disabled persons were excluded from the analysis.

Payback Period Analysis Results

To determine the payback period (Column 8), the anticipated annual tax to be recouped was divided into the aggregated excess costs of 12 years of special education. Results varied from a payback period of only 2.3 years for a speech handicapped child to 162.7 years for a severely retarded child. Most disability categories had a payback period of about 25 years. The payback period for mild retardation is only 11.2 years. Excess educational cost, rather than total cost, was the statistic chosen to compute the payback period and the long term savings because all American children are presumably guaranteed at least the basic educational entitlement that their more "normal" peers receive. Hence, the excess cost derivatives were thought to have considerably more implications for public policy development than would extrapolations based on a total cost formulation, an approach which would seem to assume a handicapped child must first economically justify his educational rights to obtain them.

Table 3

SPECIAL EDUCATION PAYBACK PERIOD COMPUTATIONS: PER CHILD EDUCATED (1974)

Handicap[1]	Cost Index[2]	Cost/ Pupil Regular Program[3]	Excess cost One Year[4]	Excess Cost 12 Years[5]	Tax Recouped One Year[6]	Tax Recouped 40 Years[7]	Payback Period (yrs.)[8]	Subtotal: Long-Term Savings[9]
Retardation, Mild	1.87	$1,207	$1,050	$12,601	$1,121	$44,840	11.2	$32,239
Retardation, Severe	2.10	1,207	1,328	30,416	187	7,480	162.7	(-22,936)
Learning Disability	2.16	1,207	1,400	31,285	1,121	44,840	27.9	13,555
Emotional, Mild	2.83	1,207	2,209	26,508	1,121	44,840	23.7	18,332
Emotional, Severe	2.83	1,207	2,209	26,508	187	7,480	141.8	(-19,028)
Speech	1.18	1,207	217	2,604	1,121	44,840	2.3	42,236
Visual	2.97	1,207	2,378	28,536	1,121	44,840	25.5	16,304
Auditory	2.99	1,207	2,402	28,824	1,121	44,840	25.7	16,016
Orthopedic	3.64	1,207	3,186	38,237	1,121	44,840	34.1	6,603
Other	2.73	1,207	2,088	25,056	1,121	44,840	22.4	19,784

Subtotal Including Net Income Maintenance Adjustment To Long Term Savings[10]	Daily Institution-alization Per Capita Costs[11]	Institution-alization: Annual Costs[12]	Institution-alization: Lifetime Costs[13]	Net Institutional Avoidance Benefits[14]	Long-Term Savings[15]
$77,079	$26.02	$ 9,497	$617,305	$364,210	$441,289
(-11,724)	26.02	9,497	617,305	364,210	352,486
58,395					58,395
63,172	30.86	11,264	732,154	431,971	495,143
(-7,818)	30,86	11,264	732,154	431,971	424,153
87,076					87,076
61,144					61,144
60,856					60,856
51,443					51,443
64,624					64,624

19-a

Technical Notes:

1. "Other" category includes multihandicapped.

2. Rossmiller, et.al.(1970).

3. National Center for Educational Statistics (1976) - 1974 data.

4. Σ(Column 2 x Column 3) - Column 3.

5. Column 4 x 12 months

6. For all handicaps except severe retardation and severe emotional assumptions are: $2.30 per hour (Federal minimum wage) x 37.5 hours/week x 52 weeks/yr. Tax rate used is 25% of gross earnings and includes estimated taxes to be paid to all units of government (Tax Foundation, 1975). Estimates for severe retardation and severe emotional disturbance assume workshop employment at $.99/hr. in conformity with the Greenleigh (1975) sheltered workshop remuneration study. (30 hour week and 42 week year assumed). Tax rate assumption is reduced to 15% for these two severe categories because of reduced income. Tax rate reduction is not proportionately linear since many governmental taxes are regressive.

7. Column 6 x 40 working years, assuming continuous employment and unadjusted for inflation and productivity increases.

8. Column 5 (Excess Cost) ÷ Column 6 (Tax Recouped: One year).

9. Column 7 (Tax Recouped: 40 years) - Column 5 (Excess Costs: 12 years).

10. Column 9 (Subtotal: Long Term Savings) + (40 years x $1,121) for all except severe categories. This income maintenance estimate ($1121 annually) derives from Conley (1973), who estimated the taxes recouped from the disabled's earnings (25%) to be approximately equal to income maintenance payments avoided. For the severe categories, a 75% reduction in income maintenance savings is assumed, and is therefore estimated to be $11,210 over a 40 year working life at sheltered workshop wages.

11. Retardation costs are maintenance only, and derive from Sheerenberger (1975); Mental hospital costs are derived from recent National Institute of Mental Health data (1975). Both apply to 1974 cost data.

12. Column 12 x 365 days.

13. Column 12 x 65 year assumed lifetime.

14. This column actually represents the "custodial costs" associated with institutionalization. Adjustments for normal consumption expenditures and also for educational and developmental program expenditures have been made to the figures appearing in Column 13 - lifetime institutionalization costs. The method of calculation was extrapolated from Conley's 1968 data analysis (1973, p. 28) and based on more recent 1974 data. The Net Institutional Avoidance Benefits are 59% of per capita maintenance costs.

15. Long-term savings constitutes taxes recouped (Column 7) plus income maintenance payments avoided (computed in column 10) for all disability categories except retardation and emotional. For these disabilities, the institutional avoidance costs for custodial care (column 14) are additive, yielding considerably higher long term savings to the community.

20-a

Positive Investment Return Demonstrated

Inspection of the data presented in the payback period table reveals that excess costs alloted for expenditures for the education of handicapped children tends to produce a substantially positive return on investment. At prevailing Federal Government minimum wage and tax rates, a nonseverely disabled individual will pay $44,840 during a 40 year working life in direct taxes. An additional anticipated reduction in income maintenance payments, also $44,840, causes this yield on educational investment to produce a positive long-term savings gain to the community of between $51,443 for an orthopedically handicapped person and $77,079 for a mildly retarded individual. In fact, for **all** non-severe disability categories, the projected taxes recouped directly and also indirectly through income maintenance avoidance, exceeds the total costs of a 12-year educational experience. For example, the highest cost index -- 3.64 -- suggests that the 12 year total educational costs would be $52,722 for orthopedic handicap (12 years x $1,207 x 3.64). Direct taxes and income maintenance savings amount to $89,680 for a forty year period yielding a net long term savings of $36,958 for this most educationally expensive disability category, even based on a total cost premise.

Only in the case of severe intellectual retardation or emotional disturbance does the educational payback period exceed the normal working lifetime and therefore indicate slightly negative results in long term savings (-$11,724 and -$7,818). If, however, institutional avoidance custodial costs are considered in the computation, net long term savings also shows positive results for these severe disabilities -- on the order of $350,000 to $424,000 over a 65 year lifetime. Hence, institutional avoidance costs are the primary

benefit source of long term savings to society from educational intervention in retardation and emotional disability. It is, however, erroneous to view these greatly amplified long-term savings computations literally as guaranteed returns on investment. Rather, a more proper interpretive stance is to consider these estimated savings as a form of potential investment return, which may or may not be reached, depending, among other things, upon the self sufficiency attained by a disabled individual over his lifetime. Some, perhaps all, of the institutional avoidance savings computed in the payback model will no doubt need to be redeployed through community-based educational, social service, and health programs to finance partial and in a few cases complete support of a small, but very costly portion of the disabled target population. Hence, we can conclude only that as the severity of cognitive or emotional handicap increases, the payback period lengthens, and the potential for a positive investment return diminishes primarily because employment earnings and also institutional avoidance savings are less likely. The educational experience itself also tends to be more expensive.

Being handicapped does not, however, as our analysis implicitly assumed, necessarily equate with "earning disability." Obviously, many noncognitive handicaps do not restrict earning capacity at all. A handicapped individual earning a lifetime income at the 80th percentile nationally, $12,080 annually, will, for example, pay $120,000 in direct taxes. One physically handicapped individual earning at this level will pay for his excess educational costs and also for the excess costs of 12 years of speech therapy for more than 25 other students. Likewise, a visually or auditorily handicapped individual paying taxes on 80th percentile earnings over a 40 year working life will pay for his excess educational costs and also for the excess costs of educating three moderately retarded students for 12 years. Using a converse assumption, the direct

taxes paid by a continuously employed handicapped individual earning a sub-minimum wage of $73.46 weekly will pay for his 12 year educational excess costs, regardless of the type of his disability. This particular wage is at the 40th percentile nationally for individuals age 14 years and over in 1974 (Census Bureau, 1976).

Some Interpretive Cautions

Because the foregoing analysis has had to be predicated on operationally restrictive assumptions, stemming in part from the quite limited availability of longitudinal earnings data, several cautions are in order. First, the analysis results are very sensitive to altered assumptions. If a wage lower than the present $2.30 per hour federal minimum is used as the earnings constant, the payback period will, of course, lengthen and the net long term savings will drop proportionately. If a higher wage is assumed, the opposite will be true. Similar results apply to use of another earnings constant for severe disability.

A second interpretive limitation derives from the innate tendency of all fiscal studies to oversubscribe to quantitative logic. That is, the analysis has not considered at all the psychosocial benefits of education for the handicapped individual, his family, and the community and society at large. Quantitative or cost analysis logic is at best only slightly relevant to the problem of evaluating public investment decisions in special education. Income redistribution to classes and regions and the promotion of individual self sufficiency is the overriding objective in most public programs. Maas (1967), for example, has made it clear that economic efficiency is certainly not the basic objective in United States social policy. And, as Wildavsky (1967) explains, cost analysis studies are embossed with political value choices and computational uncertainties. But it would be foolish for decision-makers to ignore cost studies and quantitative logic entirely.

Another very significant interpretive caution stems from the fact that the benefit side of the cost-benefit equation has been deliberately over-emphasized in our comparative analysis. First, streams of long term costs and benefits were not discounted to present value dollars. A more sophisticated analysis would sensitively consider this variable -- and the net effect would be to reduce somewhat the impact of the undiscounted totals presented in the pay-back computations (Table 3). Second, cost-benefit analysis does not, as did our analysis, occupy itself with excess cost. It considers only total costs. And third, it is beyond the present state of the evaluative art in cost analysis to control for the relative and specific contributions of special education, re-habilitation, and a host of other social programs which may each impact quite positively upon the life of a disabled person. To make analysis manageable, the payback period computations assumed that in the absence of educational services, handicapped adults would have had no earnings. A lack of schooling is a major employment impediment in our society, but not necessarily a prohibitive one.

AN INTERNATIONAL PERSPECTIVE

A Case for Public Investment in Special Education

The education of handicapped individuals is a necessary investment component of a comprehensive human development service system. In any given society, it makes good economic sense for educational planners to link monetary investment in special education with realistic occupational prospects. If this is not done, the result may be grave discontinuity between schooling and the economy. If an economy is agriculturally based, for instance, it behooves education officials to sponsor programs to develop the handicapped child's skills to complement this reality and not ignore it. This is particularly true in the economically less developed countries, where unemployment is a serious and growing problem. The potential labor force in Europe and North America never grows more than about 1% a year; it

grows three times this fast in less developed countries, according to Caiden and Wildavsky (1974). This redundancy in the labor force is usually concentrated in the most simple skill areas, where labor is virtually interchangeable and everyone — including some seriously disabled individuals -- can perform these tasks. Herein then lies one economic argument for providing education or simple skill training to disabled individuals of all nations, regardless of economic wealth.

Dybwad and Dybwad (1970) have, however, observed an unfortunate tendency on the part of international assistance agencies to consider disability as a problem area which must wait for attention until later stages of economic development. This approach ignores the great value of investment in human capital. In fact, as more individuals leave rural areas for the industrializing cities, a gradual disintegration of the joint family system may result, necessitating the inauguration of new and exceedingly expensive governmental services for handicapped children and adults previously cared for in the home or village. Thus, early intervention -- particularly preventative health care and early education for the handicapped child -- appears to promise a substantial investment return for the economically less developed nations of the world.

There is, then, an economic case for public investment in the education of handicapped children. The foregoing analysis certainly indicates this to be true for economically developed countries such as the United States. It appears also to be a sound and necessary public policy investment in less developed countries presently stalking industrialization. The great expense of not developing the maximal self sufficiency of disabled individuals must

certainly be paid sooner or later. It is therefore more than sentimentally comforting -- it is economically comforting as well -- to report that U.S. President Gerald Ford recently signed into law landmark special education legislation authorizing $7.8 billion in federal funds to be spent to assist the states in financing the excess costs of educating this nation's eight million handicapped youngsters. How well the legislation fares in the annual appropriations process over the next several years will reflect our political commitment to an ethically and economically sound social objective.

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